<u>AMENDMENTS TO THE SPECIFICATION</u>:

Please change the title as follows:

ORGANIC LIGHT EMITTING DIODE ~~COMPRISING MICROLENS~~

On page 1, immediately following the title please insert headings as follows:

BACKGROUND OF THE INVENTION

Field of the Invention

On page 1, after line 5 please insert a heading as follows:

Related Technology

On page 3, after line 21 please insert a heading as follows:

GENERAL DESCRIPTION OF THE INVENTION

The paragraph beginning on page 3, line 22 has been changed as follows:

~~We have now found that improvements~~ <u>Improvements</u> in light emission, in particular in luminous intensity, from an OLED device can be achieved by the use of spherical microlenses formed in or attached to the substrate, at the surface thereof defining the substrate-air interface, that are so configured that the radius of curvature (*R*) to substrate thickness (*T*) ratio (*R* / *T*) is in the range from 0.2 to 0.8. Thus, the perceived brightness to a viewer can be increased, particularly when the device is viewed from an angle at, or close to, normal with respect to the substrate.

On page 3, after line 28 please insert the following headings and paragraphs:

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1a is a cross-sectional view of a typical prior art bottom emitter OLED;

Fig. 1b is a cross-sectional view of a typical prior art top emitter OLED;

Fig. 2 is a diagram of a simulated OLED modeled as described in the examples; and,

Figs. 3a, 3b, 3c, and 3d show luminous intensity results for a range of emitting lengths and radii of lens curvature for an OLED modeled as described in the examples.

DETAILED DESCRIPTION OF THE INVENTION

The paragraph beginning on page 4, line 1 has been changed as follows:

Accordingly, the ~~present~~ invention provides an OLED device having at least one pixel, comprising:

The paragraph beginning on page 4, line 7 has been changed as follows:

a microlens for each pixel, having a radius of curvature R, disposed on the front surface of the light coupling layer such that its ~~centre~~ center of curvature is within the light coupling layer,

The paragraph beginning on page 4, line 18 has been changed as follows:

a microlens for each pixel, having a radius of curvature R, disposed on the front surface of the substrate such that its ~~centre~~ center of curvature is within the substrate, wherein the radius of curvature R and the substrate thickness T are such that $R = xT$, where x has a value in the range from 0.2 to 0.8.

The paragraph beginning on page 5, line 1 has been changed as follows:

a microlens for each pixel, having a radius of curvature R, disposed on the front surface of the encapsulating layer such that its ~~centre~~ center of curvature is within the encapsulating layer,

The paragraph beginning on page 5, line 6 has been changed as follows:

Preferably, the lens is ~~centred~~ centered over the light emitting portion of the OLED, i.e. the multi-layer sandwich, in order to ensure isotropic emission from the light coupling layer. However, for applications where anisotropic emission may be desired, for example to increase the brightness of an LEP display when viewed from a particular angle other than normal to the plane of the light coupling layer, the lens may be positioned ~~off-centre~~ off-center with respect to the light emitting portion.

In order to provide an advantage in terms of improved light emission (luminous intensity) from the light coupling layer, i.e. from the substrate according to the first aspect and from the encapsulating layer according to the second aspect, and thus a discernable increase in brightness to a viewer, the light coupling layer and the microlenses should be so arranged that the ~~centre~~ center of curvature of the microlenses is within the light coupling layer, and should be so configured in relative size that the radius of curvature R of the lenses and the thickness T of the light coupling layer satisfy the equation $R = xT$, wherein x has a value in the range from 0.2 to 0.8. For example, x is in the range from 0.4 to 0.6, preferably in the range from 0.45 to 0.6, more preferably in the range from 0.47 to 0.55, more preferably still x is in the range from 0.49 to 0.55, and most preferably x is 0.5.

Preferably, each microlens is disposed on the front surface of the light coupling layer so as to extend across the full width of each pixel. Consequently, if the pixel array has a regular pixel pitch P, and the ~~centre~~ center of curvature of each lens is at a distance D from the front

surface of the light coupling layer, it follows that $D^2 + P^2/2\ R^2$. Accordingly, $D = R\sqrt{(1\text{-}1/2\ y^2)})$ if y is defined as *R/P,* Preferably, D = zT wherein z = 0.2-08, preferably 0.3-0.7, more preferably 0.4-0.6 and most preferably about 0.5.

The paragraph beginning on page 6, line 6 has been changed as follows:

The pixel pitch P can be decreased ~~whilst~~ while still satisfying the criterion that R = xT by moving the ~~centre~~ of curvature of the lens a distance D below the front surface of the light coupling layer, always provided that $D < R$.

The paragraph beginning on page 8, line 1 has been changed as follows:

a glass microlens of refractive index in the range from 1.49 to 1.53 having a radius of curvature R=0.35 mm disposed on the front surface of the glass substrate, whereby its ~~centre~~ center of curvature is at a distance *D*=0.316 mm from the front surface of the glass substrate, and R = 0.5T.

The paragraph beginning on page 8, line 17 has been changed as follows:

Optical ~~modelling~~ modeling was performed using micro-lenses on OLED devices, to show the effect of changing the substrate size, the emitting area and the use of varying radii of curvature of the micro-lenses on the light output. The ~~modelling~~ modeling was performed using proprietary software Trace-pro®, a non-sequential ray-tracing program useful for optical analysis of light rays through solid models. The program allows the source material to be defined in terms of its optical properties, i.e. scattering and surface texture as well as complex refractive indices, and calculates the propagation of multiple rays of an initial light flux through the material. As the rays propagate through the model, portions of the flux of each ray are allocated for absorption, specular reflection and transmission, and scattering. The flux of each

ray is reduced at each ray-surface interaction, until it falls below a set threshold or is fully absorbed at a defined target position. The program uses Monte Carlo methods to ~~analyse~~ analyze the ray tracing. Such a method uses randomness to predict the ray emission location and directions, in contrast to using sequential methods.